

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
SUIT PRESSURE TRANSDUCER ITEM 114 ----- SV767788-1/-2 (1)	2/2	114FM03A  Erroneous output voltage (Drifts Low).  Failure of potentiometer linkage due to increased friction. Mechanical shock loading of linkage which causes a misalignment of resistive element relative to wiper. Failure of resistive coil due to open on high voltage side of the coil.	END ITEM: False indication of low suit pressure.  GFE INTERFACE: At the start of the suit leak check, the CWS is unable to confirm a 4.05 psid suit pressure to initiate the sequence.  MISSION: Terminate EVA. Loss of warnings for low suit pressure.  CREW/VEHICLE: None.  TIME TO EFFECT /ACTIONS: Seconds.  TIME AVAILABLE: N/A  TIME REQUIRED: N/A  REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - -1 Conrac and -2 Gulton: The sensing element is made of an all welded solution hardening Inconel diaphragm to maximize strength and reduce any shift due to over stressing it. All linkage/resistive element attaching screws are potted in place to prevent shifting. The assembly is vacuum outgassed and temperature cycled until stable. The sensor design minimizes sensor output shifting, increase in friction and excessive resistive element wiper wear. The vacuum reference cavity is hermetically sealed in an all metal/glass, welded/brazed case.  B. Test - Component Acceptance Test - Conrac: The sensor is subjected to acceptance testing per Conrac procedure ATP 451239-64 prior to shipment by the assembly vendor. This testing includes the following tests to insure the sensor is stable. The sensor is subjected to random vibration (6.1 grms) testing to insure there are no workmanship or material problems that would cause the voltage to shift low. The sensor is subjected to calibration testing at high and low temperature (30 to 120 degrees F) to insure there are no defects that thermal expansion/contraction would uncover. The sensor is calibration checked many times during acceptance testing to insure sensor is stable. Proof pressure tested for one minute at 9 psig to insure pressure stability.  Gulton: The sensor is subjected to acceptance testing per Gulton procedure ATP 3031-15101 prior to shipment by the assembly vendor. This testing includes the following tests to insure the sensor is stable. The sensor is subjected to random vibration (6.1 grms) testing to insure there are no workmanship or material problems that would cause the voltage to shift low. The sensor is subjected to calibration testing at high and low temperature (30 to 120 deg F) to insure there are no defects that thermal expansion/contraction would uncover. The sensor is calibration checked during acceptance testing to insure sensor is stable. Proof pressure tested or one minute at 9 psig, to insure pressure stability.  PDA Test - The sensor is calibration checked at 0 and 6.0 psig as assembled on the PLSS to ensure the output voltage is within spec limits per SEMU-60-010 Test 27.  Certification Test - Certified for a useful life of 20 years (Ref. EMUM1-0084).  C. Inspection - Conrac: The sensor is visually inspected prior to case assembly to insure there are no workmanship problems which could cause the output voltage to shift low. The sensor is calibration checked at various steps in the assembly process to insure the sensor output is within specified limits. Gulton: The sensor is visually inspected prior to case assembly to insure there are no workmanship problems which could cause the output voltage to shift low. The sensor is calibration checked at various steps in the assembly process to insure the sensor output is within specified limits. The sensor is pressure cycled for at least 350 cycles during assembly to insure the sensor is stabilized. The sensor is temperature cycled between -65 degrees F and +200 degrees F to insure it is

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114FM03A

stable.

D. Failure History -

The following RDR's were issued for Item 114 due to the output voltage drifting low:

H-EMU-114-C003 (8-24-84) - Output voltage drifted low after certification test unit had completed 40,000 Full scale pressure cycles. The spec was changed to 25,000 cycles, which represents a factor of 12 over the real time use cycles of 2000 over 15 years.

H-EMU-153-001 (4-22-87) Shield circuit resistance too high. The high resistance was a result of the use of a lubricant on the interfacing connector shell surface.

This prevented proper grounding of the mating connector. EC-42807-129-2 adds a grounding ring, provided by Bendex Corp., to all units. There is no impact on certification. Ground tested per FEMU-R-001, Transducer and DCM Gauge Calibration Check.

E. Ground Turnaround -

Tested for non-EET processing per FEMU-R-001, Transducer and DCM Gage Calibration Check. FEMU-R-001 Para 8.2 EMU Preflight KSC Checkout for EET processing.

F. Operational Use -

Crew Response -

PreEVA: If failure can be determined to be sensor, continue with EVA prep. Perform manual leak checks.

Training - Standard EMU training covers this mode.

Operational Considerations -

For single failure, no constraints.

EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Real Time Data System allows ground monitoring of EMU systems.

EXTRAVEHICULAR MOBILITY UNIT  
SYSTEMS SAFETY REVIEW PANEL REVIEW  
FOR THE  
I-114 PRESSURE SUIT SENSOR  
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

Prepared by: *J. Plouffe* 3/27/92  
HS - Project Engineering

Approved by: *[Signature]*  
NASA - SSM  
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*M. Snyder*  
HS - Reliability

*[Signature]*  
NASA - SSM

*Alan Plough for RMC*  
HS - Engineering Manager

*[Signature]*  
NASA - SSM

*[Signature]*  
NASA - MOD

*[Signature]*  
NASA - Crew

*[Signature]*  
NASA - Program Manager